PAUL JEAN JOSEPH BARBARIN

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BIOGRAPHICAL SKETCH OF PAUL BARBARIN.

By DR. GEORGE BRUCE HALSTED, Greeley, Colorado.

Paul Jean Joseph Barbarin, one of the greatest of living geometers, was born October 20, 1855, in Tarbes (High Pyrinees). He had the almost indispensable advantage for mathematical achievement of a very early start, which came about as follows: Though his father was a professor of mathematics, and tried early to awaken in him a taste for the sciences, yet our Professor Barbarin slighted these lessons until after he had taken, when scarcely 16 years old, his degree of Bachelor of Letters. The following year, to please his father, he consented to take a course in elementary mathematics, when the love of science quickly developed, and he expressed a wish to attend the Polytechnic School and the Normal School. He entered the Polytechnic for a short time, but changed to the more congenial Normal, where at 19½ years of age he settled down to prepare for his life work. He studied under Briot, Bouquet, Tannery, and Darboux.

His course finished, he became professor of mathematics at Niza, then at the School of St.-Cyr of the Lyceüm of Toulon. Since 1891 he has been professor at the Lyceum of Bordeaux. He married a highly intellectual lady, born at Reichshofen in Alsace, and her mastery of German, English, Spanish, and Portugese has given essential help in his writings. Our Professor is noted for his devotion to the river and sea and all aquatic sports, but above all to music. Both he and his wife play brilliantly upon the violoncello, and their charming home is a center for the musical cult.

Notwithstanding the heavy draft of his teaching upon his energies, he has been extraordinarily productive and original as a geometer, his discoveries in non-Euclidean geometry being particularly brilliant. The report on his works by Professor Mansion on the occasion of the third award of the Lobachevski prize, where he was second only to Hilbert, I have given in full in English in *Science*, Vol. XX, pp. 353-367. From this a single sentence may be here reproduced: "Non-Euclidean geometry owes to M. Barbarin (1) fundamental properties of the plane trirectangular quadrilateral; (2) the discovery of Riemannean equidistant straights; (3) the complete

classification of non-Euclidean conics and quadrics; (4) the most intuitive formula that we know for the determination of volumes, with a remarkable application to the tetrahedron; (5) finally and above all, the beautiful general theorem cited above on the geodesics of tubes and pseudospheres, in the three geometries."

Professor Barbarin is like Poincaré in adding to his creative power the gift of brilliant exposition. An example is his beautiful little book, "La Géométrie non-Euclidienne." The first edition of this I reviewed in *Science*, Vol. XV, pp. 984-988. A second edition has now been issued by Gauthier-Villars, 8vo, 91 pages, greatly improved; for example, by introducing the single elliptic geometry so strangely unmentioned in the first edition. This delightful little treatise is a perfect gem.

Of late Professor Barbarin, already noted as worthy successor of Hoüel, who made Bordeaux sacred ground for non-Euclidean geometry, has exhibited, like his beloved predecessor, a genius for translating. His translation, La Spherique non-euclidienne, in L' Enseignement mathématique, No. 2, 10e année, Mars 1908, pp. 97-111, is a marvel of elegance, clearness, and accuracy.

The celebrated Société des Sciences de Bordeaux honored itself in 1905 when it elected Professor Barbarin as its president.

A List of the Principal Memoirs and Works of P. Barbarin.

1. Note sur les coordonnèes bipolaires. (Nouvelles Annales). 1882.
2. Note sur la droite de Simpson. (Mathesis). 1882.
3. Sur l' Herpolhodie: N. A. 1885.
4. Sur un Systeme d' Equations. Revue de Speciales. 1894.
5. Normales généralisées. Revue de Speciales. 1894.
6. Systemes isogonaux du triangle. A. F. A. S. 1896.
7. Triangles dont les bissectrices ont des longueurs données. M. 1896.
8. Constructions Spheriques. M. 1899.
9. Etudes de géométrie Analytique non-Euclidienne. Bruxelles. 1900.
10. Géométrie Infinitesimal non-Euclidienne. Lisbonne. 1901.
11. Ve Livre de Metagéométrie. M. 1901.
12. Polygones réguliers Spheriques. Le Matematiche. 1902.
13. Cosegments et Volumes. (Memoires de Bordeaux). 1902.
14. La Geometrie non-Euclidienne. (Scientia). Paris. 1902.
15. Calculs abrégés de Sinus et Cosinus. (Memoires de Bordeaux). 1904.
16. Bilatères et Trilatères. M. 1902.
17. Considerations sur la forme de l' Espace. (Enseignement Math.). 1902.
16. Spherique non-Euclidienne de G. B. Halsted. (Enseignement Mathématique). 1908.
19. Recueil de Calculs Logarithmiques. Paris, Nony. 1893.
20. Complements sur les Courbes usuelles. Paris, Nony. 1898.